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By-Shorkey, Clayton Thomas
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Some 80, white, schizophrenic patients were administered the Taylor Personality Scale of Manifest Anxiety (MAS), the Maudsley Personality Inventory (MPI) and were tested on an operant conditioning task. Hypotheses tested were: (1) effectiveness of social reinforcement (verbal approval) on a verbal conditioning task would be enhanced by subjecting patients to a short period of social isolation prior to the task, (2) social reinforcement presented by an experimenter of the opposite sex would be maximally effective, (3) no significant relationship exists between the personality variable "anxiety" (MAS) and subjects' change scores on a verbal operant conditioning task, and (4) no significant relationship exists between the personality variable "introversion" (MPI) and subjects' change scores. In addition to the variables age, sex, education diagnosis; length of institutionalization, and level of neuroticism were studied in relation to conditionability of schizophrenics. Social isolation, and testing by an experimenter of the opposite sex favorably affected conditioning. No significant relation was found between change scores on the conditioning tasks and patients' scores on the MAS, on the Introversion-Extroversion scale of the MPI, sex, length of institutionalization, education or N (neuroticism) scores of the MPI. (PS)

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A STUDY OF VARIABLES RELATED TO CONDITIONABILITY OF VERBAL BEHAVIOR IN SCHIZOPHRENICS[1]

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Clayton Thomas Shorkey

This study investigated the relationship of four experimental variables and the degree of change induced in subjects during a verbal conditioning task. Four hypotheses were tested in this study: (1) The effectiveness of social reinforcement (in the form of verbal approval) would be enhanced by subjecting the patient to a short period of social isolation prior to the use of reinforcement "good" in a verbal conditioning task: (2) Social reinforcement presented by an experimenter of the opposite sex would be maximally effective; (3) No significant relationship exists between the personality variable "anxiety" as measured by the Taylor Manifest Anxiety Scale and change scores of the schizophrenics on a verbal operant conditioning task; and (4) No significant relationship exists between the personality variable, introversion, as measured by the Maudsley Personality Inventory and change scores of the patients on the conditioning task. This study also provides information on six other variables which may be related to conditionability of schizophrenics. These variables are: Age, sex, education, diagnosis, length of institutionalization, and level of neuroticism (as measured by the Maudsley Personality Inventory).

Forty male and 40 female schizophrenic patients who could read, write, understand test directions, and cooperate with the experimenters were used in this study. Subjects were tested in groups of 10 to 20 on the Manifest Anxiety Scale and the Maudsley Personality Inventory, and were then randomly assigned to one of eight experimental groups and tested on a sentence construction task.

Eighty stimulus cards containing one verb and six pronouns were used in the sentence construction task. Subjects were asked to make up a sentence using the verb and one pronoun on each card. Trials 1 to 35 were not reinforced by the experimenter. During trials 36 to 80, sentences beginning with "I" or "we" were verbally reinforced with "good" by the experimenter. A change score was calculated to determine the change in frequency of sentences beginning with "I" and "we" after their first reinforcement and the frequency of these pronouns during the 35 base rate trials.

Twenty male and 20 female subjects were tested on the sentence construction test using "good" as a reinforcer following a 15-minute period of social isolation. Twenty male and 20 female subjects were also tested without being subjected to a period of isolation. In both the isolation and non-isolation conditions half of the patients were tested by an experimenter of the same sex and the other half were tested by an experimenter of the opposite sex.

Results of the study showed that schizophrenic patients who were socially isolated for a period of 15 minutes before testing, emitted significantly more reinforced pronouns during the acquisition period than patients who were not isolated before testing ($p < .01$). Second, results also indicated that patients tested following the isolation period conditioned better when tested by an experimenter of the opposite sex ($p < .07$). No significant correlations were found between subjects' scores on either the MAS or on the IE scale of the MPI and change scores on the conditioning task. No significant relation was found

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Center for Research on Language and Language Behavior
University of Michigan

between change scores and sex of the patient, length of institutionalization, education, or scores on the N scale of the MPI. The correlation between age and change scores on the conditioning task was significant at the .01 level. The correlation coefficient was -.37, which, although significant, indicates only a low correlation between the two variables.

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CHAPTER I

Introduction

Krasner (1955) suggested that social reinforcements provided by the therapist in the form of smiling, nodding, and overt speech have an effect upon the verbal behavior of the patient. Krasner stated that the therapists may use social reinforcements to start the patient talking and to guide his verbalizations into areas the therapist feels will be beneficial to the patient.

Since 1955, a number of studies illustrating the effectiveness of the controlled use of social reinforcers in interview setting with schizophrenics has been reported. Krasner (1958) and Slechta, Gwynn, and Peoples (1963) reported successful manipulation of the frequency of reference to specific persons in stories made up by schizophrenic patients. The manipulation of affect (self-evaluative statements of patients) has been demonstrated by Salzinger and Pisoni (1958), Salzinger and Pisoni (1961), and Ullmann, Krasner, and Collins (1961). Dinoff (1960) demonstrated the ability to control the frequency of verbal responses catalogued as "personal," "therapist," "environment," or "group" in patients undergoing group therapy. Cohen and Cohen (1960) demonstrated an ability to increase the frequency of sentences constructed by patients beginning with "I," "we," "he," or "they." Social reinforcement was presented following the pronouns selected for experimental manipulation.

These studies report the effectiveness of social reinforcement in modifying the frequency and content of verbal responses during interviews with schizophrenics, but do not provide information about the relationship between the degree of change of the verbal responses under reinforcement and other variables, such as age of the patient. Nor do the studies cited above provide information

concerning variables in the interview situation that might be controlled to increase the effectiveness of social reinforcement.

Other studies using normals and psychiatric patients as subjects do deal with some of the variables related to the degree of change induced by verbal conditioning procedures. Some of the variables studied include: social isolation, sex of subject, sex of experimenter, level of anxiety, level of introversion, age, education, IQ, experimenter characteristics, orienting response, etc.

This study investigates two variables that may be controlled to maximize the effectiveness of social reinforcement in the interview situation. The variables are isolation and sex of experimenter. The first hypothesis to be tested is that the effectiveness of social reinforcement (in the form of verbal approval) may be enhanced by subjecting the patient to a short period of social isolation prior to the use of reinforcement in a verbal conditioning task. The second hypothesis to be tested is that social reinforcement presented by an experimenter of the opposite sex is maximally effective. Two personality variables related to conditionability in several previous studies are investigated. A third hypothesis to be tested is that no significant relationship exists between the personality variable, anxiety, as measured by the Taylor Manifest Anxiety Scale, and change scores of schizophrenics on a verbal operant conditioning task; and the fourth is that no significant relationship exists between the personality variable of introversion measured by the Maudsley Personality Inventory and change scores of the schizophrenic patients on the conditioning task.

The present study also provides information on six other variables which may be related to conditionability of schizophrenics. These variables are: age, sex, education, diagnosis, length of institutionalization, and level of neuroticism (as measured by the Maudsley Personality Inventory).

CHAPTER II

Review of the Literature

Isolation versus Non-isolation

A period of deprivation during which a primary reinforcer, i.e., food, water, is unavailable to an organism usually increases the reinforcement value of these stimuli. If secondary or learned reinforcers act as do primary ones, then their strength, too, should be affected in a similar manner by a period of deprivation.

Gewirtz and Baer (1958a; 1958b) carried out two studies dealing with the possible increased effectiveness of social reinforcers following a period of social deprivation (See Table 1). In the first study, Gewirtz and Baer tested 32 nursery school children, age 3-5, on an operant conditioning task. The 16 boys and 16 girls in the sample were tested by one of two experimenters, a male or a female graduate student. The task apparatus consisted of a game involving an apparatus with two holes into which marbles could be dropped by the subject. Each child was asked to play the game and drop marbles into the holes. The first 4 minutes constituted the base rate period when no reinforcement was given. The acquisition section of the experiment lasted for ten minutes, when the experimenter reinforced the child with the words "good," "fine," or "Hm-hmm," every time the child dropped a marble in the hole preferred less during the base-rate period. A change score was calculated by comparing the frequency of marbles dropped in the holes during the base rate and the acquisition periods. Each child was tested under both deprivation and non-deprivation conditions. The child was first tested on the task upon his arrival at the experimenting room, a condition the authors conclude to be "non-deprivation." Next, the experimenter

left the child alone in the experimental room for 20 minutes, explaining that the child had to wait until the toy was repaired. The child was then retested after the 20-minute deprivation period. The results of this study indicated that a period of social deprivation significantly increased the effectiveness of the social reinforcers.

In their second study, Gewirtz and Baer (1958b) tested 102 boys and girls from the first and second grade using the same experimental task and reinforcers as the previous study, but in this study, a "satiation" condition was added. In the satiation condition the subjects drew or cut out paper designs for 20 minutes while the experimenter maintained a "stream of friendly conversation." Social reinforcement was significantly more effective after a period of deprivation than non-deprivation, and was more effective after a period of non-deprivation than after satiation.

Walters and Ray (1960) tested 40 first and second graders using the same procedure as Gewirtz and Baer (1958). This study included two isolation conditions and two satiation conditions. Children in the isolation condition were left alone in the experimental room for 20 minutes. Children in the satiation condition were tested after a 20-minute school recess break. Although Walters and Ray do not consider isolation as the most important variable in their study, their results show a significant difference in favor of the isolation group.

In 1962 Stevenson and Odom used a modification of the marble game paradigm with 30 male and 30 female subjects who were selected from the kindergarten, first, and second grades. Three conditions were studied in this experiment: non-isolation; a 15-minute period of social isolation, during which the child played with toys; and a 15-minute period of social isolation in which the child was not supplied with toys. Results of this study showed that isolation conditions significantly increased the

effectiveness of the social reinforcers. This study indicated that deprivation of social stimuli rather than stimulus deprivation is responsible for the increased effectiveness of social reinforcers. It was demonstrated that children who were supplied with toys during the period of isolation conditioned as well as children who were not supplied with toys.

Erickson (1962) tested 40 sixth-grade students, 25 males and 15 females, on a conditioning task using "good" or marbles as reinforcers. Fifty-eight index cards, each containing one animate and one inanimate noun, were used. During the base rate period, the child was asked to select one noun on each card for 10 trials. During 48 subsequent acquisition trials, the subject was reinforced for selection of each animate noun. Four experimental groups were utilized. Two were given a period of social deprivation prior to the experimental task; the other two were given a period of social satiation prior to the experimental task. During the deprivation condition the experimenter sat 15 feet away from the subject, who played a digit game; the experimenter made no comment for a 15-minute period. During the satiation condition the experimenter sat near the child (who was playing the digit game) for 15 minutes, and the experimenter said "good" or "fine" 30 times. One deprivation and one satiation group were reinforced during the subsequent conditioning task with "good" while the other two groups were reinforced with marbles. Erickson found that the deprivation condition significantly increased the effectiveness of the social reinforcer "good" but did not effect the performance of the deprivation and satiation groups reinforced with marbles.

In 1964 Hill and Stevenson tested 36 male and 36 female children from kindergarten and first and second grade. Three experimental conditions were tested using the marble game. In the non-isolation condition, the subject watched a 10-minute movie and received one verbal comment per minute from the experimenter. In the social isolation condition, the child watched the same movie alone for 10 minutes. In the third condition, the child was isolated for 10 minutes without the movie. Hill and Stevenson found that both conditions of isolation increased the effectiveness of social reinforcers significantly.

Lewis (1965) tested 150 third graders on a conditioning task involving 30 cards with either a picture of a dog or a cat in a ratio of 9 to 21. The child was asked to guess which animal would appear on the next card. Five groups undergoing different conditions of isolation were compared on this task. Social reinforcements "good," "very good," "fine," and "right" were used. The five experimental conditions tested were as follows: non-isolation, isolation for 3 minutes, for 6 minutes, for 9 minutes, and for 12 minutes. Lewis found no monotonic increase in the need for social reinforcement over the various isolation conditions. Only the subjects tested following the 12 minutes of isolation conditioned significantly better than subjects in the non-isolation condition.

Sixty female undergraduates were randomly assigned to one of four experimental groups in a study by Lipinski and Lipinski (1966). The subjects in Groups 1 and 2 were socially isolated for 30 minutes before testing. The subjects in Groups 3 and 4 (social contact) spent 30 minutes with a friend in a waiting room before testing. The experimental task required all subjects to mention anything that came to their minds for 10 minutes to obtain a base rate of the frequency of statements of self-reference. None of the subjects were reinforced during

the base rate period. During the second 10 minute period the subjects in Groups 1 and 3 were reinforced for all statements of self-reference with "mm-hum," a nod and a smile. The subjects in Groups 2 and 4 were not reinforced during this period. The results of this study showed that the subjects in Group 1 emitted significantly more self-reference statements during the second 10-minute period than Group 3.

The most recent study available to this author was conducted by Rosenhan (1967). This study used 80 boys and 80 girls from the first and sixth grades as subjects. The subjects were instructed to press one of two toggle switches on signal of a buzzer. Seventy per cent of the responses to one switch and 30% of the responses to the other switch were reinforced. Performance on this task was compared between subjects in an isolation group and subjects in a satiation group. The children in the isolation group were left alone for 15 minutes. Children in the satiation group interacted with the experimenter for 15 minutes. In the satiation group the experimenter attempted to find things that interested the child, and to reinforce him socially as often as possible. This study showed a significant increase in the effectiveness of social reinforcement on performance in the operant conditioning task for children in the isolation group.

Table 1 summarizes the major variables involved in the nine studies dealing with social isolation. Subjects in the studies included nursery school children through college students; the conditioning procedures included both verbal and non-verbal tasks; and a variety of social reinforcers and periods of isolation were used. Although the studies differed on the above mentioned variables, all studies found that a period of social isolation of at least 12 minutes significantly increased the effectiveness of social reinforcement on an operant conditioning task.

Table 1

Studies Dealing with Isolation - Non-Isolation and Reinforcer Effectiveness

Author	Subjects	Task	Reinforcement	Isolation Period	Results
Gewirtz & Baer (1958a)	32 Nursery School Children	Marble Game	Good, Fine, Hum-hum	20 Minutes	Ss in the Isolation Group Conditioned Significantly Better than Ss in the Non-Isolation Group at the .03 Level
Gewirtz & Baer (1958b)	102 First- and Second-Graders	Marble Game	Good, Fine, Hum-hum	20 Minutes	Ss in the Isolation Group Conditioned Significantly Better than Ss in the Non-Isolation Group at the .025 Level
Walters & Ray (1960)	40 First- and Second-Graders	Marble Game	Fine, Good, A Good One, Hum-hum	20 Minutes	Ss in the Isolation Group Conditioned Significantly Better than Ss in the Non-Isolation Group at the .05 Level
Stevenson & Odom (1962)	60 Kindergarten, First- and Second-Graders	Marble Game	Fine, Very Good, That's fine, Swell, You're Real Good, Good	15 Minutes	Ss in the Isolation Group Conditioned Significantly Better than Ss in the Non-Isolation Group at the .05 Level
Erickson (1962)	40 Sixth-Graders	Verbal Conditioning	Good	15 Minutes	Ss in the Isolation Group Conditioned Significantly Better than Ss in the Non-Isolation Group at the .05 Level

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Author	Subjects	Task	Reinforcement	Isolation Period	Results
Hill & Stevenson (1964)	72 Kindergarten, First- and Second Graders	Marble Game	Fine, Very Good, That's Fine, Swell, You're Real Good, Good	15 Minutes	Ss in the Isolation Group Conditioned Significantly Better than Ss in the Non-Isolation Group at the .01 Level
Lewis (1965)	150 Third Graders	Verbal Conditioning	Good, Right, Very Good, Fine	3, 6, 9 and 12 Minutes	Ss in the 12 Minute Isolation Group Conditioned Significantly Better than the Non-Isolation Group at the .01 Level
Lipinski & Lipinski (1966)	60 Student Undergraduates	Verbal Conditioning	Mm-hum, Nod, Smile	30 Minutes	Ss in the Isolation Group Conditioned Significantly Better than Ss in the Non-Isolation Group at the .05 Level
Rosenhan (1967)	160 First- and Sixth Graders	Two Toggle Switches	Good, Right	15 Minutes	Ss in the Isolation Group Conditioned Significantly Better than Ss in the Non-Isolation Group at the .06 Level

The first hypothesis to be tested is that the effectiveness of the social reinforcer "good" used in a verbal conditioning task will be increased by a short period of social isolation using schizophrenic patients as subjects. A 15-minute isolation period was used.

Sex of Subject--Sex of Experimenter--Interaction

Binder, McConnell, and Sjoholm (1957) used 47 male and female undergraduates in an operant conditioning task using "good" as the reinforcer (See Table 2). The test employed 140 index cards which had three pronouns ("he", "she", "they") and two verbs typed on them. One verb was considered neutral and the other mildly hostile. A base rate was calculated on the responses to the first 20 cards. The experimenters then reinforced hostile verbs during 120 acquisition trials. Two experimenters tested the subjects. The first, a female, was described as a very reserved, attractive young lady. The second, a male, was described as being very masculine. The female experimenter tested 6 female and 16 male subjects. The male experimenter tested 15 female and 10 male subjects. Both groups tested by the male and female experimenters showed a significant increase in the use of hostile verbs on the conditioning task. Binder et al. reported that the rate of learning of the subjects tested by the male and female experimenters differed significantly,with a steeper slope for the female experimenter's group. Since the female experimenter's group consisted of 72.7% subjects of the opposite sex, while the male experimenter's group contained 60% subjects of the opposite sex, it is possible that the difference in rates of conditioning was due to the difference in the male-female subject ratio. Therefore, this study could indicate that the subjects tested by an experimenter of the opposite sex condition better than subjects tested by an experimenter of the same sex.

In the first study by Gewirtz and Baer (1958a), one female experimenter tested 16 male and 16 female nursery school children on an operant conditioning task. There was no significant difference between male and female subjects under the two deprivation conditions.

A second study by Gewirtz and Baer (1958b) tested nursery school children under conditions of deprivation, non-deprivation and satiation on a conditioning task. The authors report that under conditions of deprivation, boys conditioned significantly better with a female experimenter than with a male. Gewirtz and Baer reported that girls tested under deprivation by a male experimenter conditioned better than those tested by a female, but this difference was not statistically significant.

Ferguson and Buss (1960) tested 40 males and 40 female college students on a verbal conditioning task using "good" as the reinforcement. This procedure, similar to that of Binder, McConnell and Sjoholm, involved 140 cards with three pronouns and two verbs. One male and one female experimenter each tested half the males and females. No significant differences were found between the sex of the subjects and the sex of the experimenters in performance on the task.

Baer and Goldfarb (1962) tested 158 children on the Taffel Sentence Construction Task under conditions that did not involve social isolation. The Taffel procedure uses 80 stimulus cards upon which one verb and the pronouns "I," "he," "she," "we," "you," and "they" are typed. Subjects are instructed to make up a sentence using one of the pronouns and the verb on each card. On the first 20 trials no reinforcement is given by the experimenter. This is done to obtain a base rate of the frequency of each of the 6 pronouns. During trials 21-80 (acquisition), all sentences beginning with "I" and "we" are reinforced with "good" by

the experimenter. Two male medical students served as experimenters. Thirty male and 28 female subjects were in the third grade. Twenty-one male and 20 female subjects were in the sixth grade, and 20 male and 30 female subjects were in the tenth grade. All groups gave significantly more responses of "I" and "we" during the acquisition period than during the base rate period. Baer and Goldfarb found that with a female subject tested by a male experimenter the higher the grade, the faster the conditioning. On the other hand, boys tested by a male experimenter showed a decrease in conditioning rate as their grade level increased. Baer and Goldfarb interpret these results as indicating that after the period of puberty, difference in sexual roles of males and females becomes an active variable which changes the adolescent's responses to persons of the same or opposite sex.

Two studies reported here support the theory of Baer and Goldfarb that states that after puberty "good" is a more effective reinforcer for individuals when administered by a person of the opposite sex. Only the study by Ferguson and Buss fails to support this idea (see Table 2).

The second hypothesis to be tested in the present study is the following: the effectiveness of the social reinforcer "good" used in a verbal condition task will be increased for schizophrenic patients tested by an experimenter of the opposite sex.

Table 2

Studies Dealing with Sex of Subject, Sex of Experimenter Interaction and Reinforcer Effectiveness

Author	Subjects	Experimenters	Task	Reinforcement	Results
Binder et al. (1957)	26 Male and 21 Female Undergraduates	1 Male and 1 Female Graduate Students	Sentence Construction	Good	A Significant Difference was Found at the .01 Level Indicating that Ss Conditioned Better when Tested by an E of the Opposite Sex
Gewirtz & Baer (1958a)	16 Male and 16 Female Nursery School Children	1 Male and 1 Female Graduate Students	Marble Game	Good, Fine, Hum-mm	Boys Conditioned Significantly Better at the .01 Level when Tested by a Female E Under Conditions of Isolation. Girls Conditioned Better when Tested by a Male E at the .1 Level under Conditions of Isolation.
Gewirtz & Baer (1958b)	51 Male and 52 Female First- and Second Graders	1 Female Graduate Student	Marble Game	Good, Fine, Hum-mm	No Significant Difference Between Ss tested by an E of the same or Opposite Sex on the Task
Ferguson & Buss (1960)	40 Male and 40 Female College Students	1 Young Male and 1 Young Female	Sentence Construction	Good	No Significant Difference Between Ss tested by E of the same or Opposite Sex
Baer & Goldfarb (1962)	71 Male and 78 Female Third-, Sixth- and Tenth-Graders	2 Male Medical Students	Sentence Construction	Good	Tenth Grade Girls Conditioned Significantly Better at the .05 Level with a Male E than Boys

Anxiety as Measured by the Personality Scale of Manifest Anxiety

Taylor (1956), Spence and Taylor (1953), and Spence (1964) claim a relationship between conditionability on a respondent conditioning task and an individual's test score on the Taylor Personality Scale of the Manifest Anxiety (MAS). Several experimenters using operant conditioning test procedures have investigated the relationship between MAS scores and level of conditioning. Rogers (1960) tested 36 male university students on the MAS and on a conditioning task (See Table 3). The subjects were assigned to one of three groups. Group 1 and 2 were reinforced by "mm-hmm" and with a nod of the head; Group 3 received no reinforcement. All subjects were given one interview without reinforcement to assess base rate of verbal responses of positive or negative self-references. During five acquisition interviews, the subjects in Group 1 were reinforced for positive self-references, while subjects in Group 2 were reinforced for negative self-references. No significant relation between conditioning scores and MAS scores was found.

Matarazzo, Saslow, and Pareis (1960) reported the results of a study involving 80 male and 80 female college students. All subjects were tested on the Manifest Anxiety Scale and on a verbal conditioning task. Subjects were instructed to "say words" in an interview setting. The base rate frequency of plural nouns and the base rate of responses defined by the authors as "human" was calculated from the first 100 words emitted by the subjects. During the acquisition trials (200 words), subjects in Group 1 were reinforced with "good" or "that's good" for plural nouns. Subjects in Group 2 were reinforced for responses referring to human beings. No significant relationship between anxiety scores on the MAS and level of conditioning was found for either group.

Gelfand and Winder (1961) tested 26 female in-patients at a state hospital using the Taffel conditioning procedure. They found no significant relation between anxiety as measured by MAS and the level of verbal conditioning.

Rowley and Keller (1962) reported a study employing 90 children, ages 9-12 as subjects. The children were administered the Children's MAS and were tested on the Taffel conditioning task. No significant difference was found between anxiety as measured by the Children's MAS and the level of verbal conditioning.

Ebner (1965) employed the Taffel procedure to test 36 schizophrenics and 36 VA medical or surgery patients to study conditioning in schizophrenics as a function of degree of social interaction. No significant differences between the level of conditioning and scores on the MAS were found for either the normal or schizophrenic groups.

Three studies investigated the relationship between level of conditioning, using the Taffel procedure, and scores on the MAS. All three studies used identical cut off scores for low, medium, and high anxiety groups. Taffel (1953) and Spielberger, DeNike, and Stein (1965) used in their studies neurotic and psychotic patients selected from a VA hospital. Taffel tested 90 subjects and Spielberger, et al. tested 48 subjects. Buss and Gerjouy (1958) included in their sample 45 neurotic or psychotic patients selected from a state hospital. All three studies showed a relationship between MAS scores and level of conditioning, but all in different directions. The Taffel study showed high-anxiety and medium-anxiety subjects conditioned significantly better than the low-anxiety group. Buss and Gerjouy reported that the medium and low-anxiety groups conditioned better than the high anxiety group. The study by Spielberger,

et al. (1965) reported that the low anxiety group conditioned better than either the high or medium anxiety groups.

Studies in which operant conditioning procedures were used to test the relationship of scores on MAS and level of conditioning do not provide support for any consistent relationship between the two variables (see Table 3). Spence and Taylor (1953), and Spence (1964), using respondent conditioning procedures, reported significant differences in level of conditioning and scores on MAS. These and other studies involving respondent conditioning are not considered in this paper. The conclusion to be drawn from the material presented here applies only to studies investigating the relationship between scores on the MAS and level of operant conditioning.

The third hypothesis to be tested in this study is the following: no significant relationship exists between anxiety as measured by MAS and change scores on an operant conditioning task.

Introversion-Extroversion

Eysenck (1957) predicted greater conditionability of introverts than extroverts. A study by Eysenck (1959) using patients' scores on the Introversion-Extroversion scale of the Maudsley Personality Inventory (MPI) supports his theory (See Table 4). One-hundred-thirty-seven adult male and female neurotics were given the MPI. They were also tested on a verbal conditioning task. Fifty stimulus cards which contained both the pronoun "they" and three verbs were presented to obtain a base rate of a selection of verbs referring to muscular activity. Fifty cards were used during acquisition and all verbs referring to muscular activity were reinforced by "hm-mm." Subjects defined as introverts gave twice as many muscular activity verbs during the acquisition period than the subjects defined as extroverts.

Table 3

Studies Dealing with Level of Anxiety
and Conditionability of Subjects

Author	Subjects	Task	Reinforcement	Results
Rogers (1960)	36 University Students	Verbal (free association)	Mm-hmm and Head Nod	No significant relationship was found between level of anxiety and level of conditioning
Matarazzo, et al (1960)	160 College Students	Verbal (free association)	Good, That's good	No significant relationship was found between level of anxiety and level of conditioning.
Gelfand & Winder (1961)	26 Patients at State Hospital	Sentence Construction	Good	No significant relationship was found between level of anxiety and level of conditioning
Rowley & Keller (1962)	90 Children, ages 9 - 12	Sentence Construction	Good	No significant relationship was found between level of anxiety and level of conditioning
Ebner (1965)	36 VA Hospital Patients	Sentence Construction	Good	No significant relationship was found between level of anxiety and level of conditioning
Taffel (1953)	90 Psychiatric Patients	Sentence Construction	Good	Ss in the high and medium anxiety groups conditioned significantly better than the Ss in the low anxiety group at .05 level.
Speilberger et al (1965)	48 Psychiatric Patients	Sentence Construction	Good	Ss in the low anxiety group conditioned significantly better than Ss in the high or medium anxiety groups at the .01 level.
Buss & Gerjouy (1958)	45 Psychiatric Patients	Sentence Construction	Good	Ss in the medium and low anxiety groups conditioned significantly better than Ss in the high anxiety group at the .05 level.

Gelfand and Winder (1964) also administered Guilford's R scale as a measure of introversion to the 26 female patients tested. This study reported no significant differences on scores of the Guilford R scale and level of conditioning.

McDonnell and Inglis (1962) tested 65 undergraduate students on the MPI and the Taffel Sentence Construction Test. The product moment correlation of change scores with the MPI scores was not statistically significant.

Beech and Adler (1963), using a Taffel-type conditioning procedure and MPI scores, found no significant relation between introversion-extroversion and change scores on the conditioning task.

The most recent study available to this author was reported by Goodstein (1967). Goodstein administered the Guilford R scale to 220 college students. The top and bottom 40 females (20 extroverts and 20 introverts), as rated on the Guilford R scale, were tested using the Taffel procedure. Results showed no significant difference in conditioning between the extrovert and the introvert groups.

All studies reported here, except that of Eysenck (1959), fail to support Eysenck's theory that introverts condition better than extroverts, using operant conditioning procedures (see Table 4).

The fourth hypothesis to be tested in this study is the following: no significant relationship exists between level of introversion as measured by the MPI and change scores on an operant conditioning task.

Control Variables

This study also provides information on six variables for which no hypothesis is presented. These variables comprise sex, age, level of education, score on neuroticism scale of MPI, diagnosis, and

Table 4

Studies Dealing With Level of Introversion

and Conditionability of Subjects

Author	Subjects	Task	Reinforcement	Results
Eysenck (1959)	137 Neurotics	Verbal Conditioning	Hum-mm	Ss defined as introverts gave twice as many responses than did extroverts during acquisition.
Gelfand & Winder (1964)	26 Psychiatric Patients	Sentence Construction	Good	No significant difference was found between level of introversion and conditionability.
McDonnell & Inglis (1962)	65 College Students	Sentence Construction	Good	No significant difference was found between level of introversion and conditionability.
Beech & Adler (1963)	31 Normals and 81 Psychiatric Patients	Sentence Construction	Good	No significant difference was found between level of introversion and conditionability.
Goodstein (1967)	220 College Students	Sentence Construction	Good	No significant difference was found between level of introversion and conditionability.

length of institutionalization. In a review of the literature, this author found no studies involving operant conditioning tasks dealing with the variables: diagnosis, length of institutionalization or score on neuroticism as measured by MPI. Studies reporting information with regard to age or level of education of the subject and conditionability deal only with children. The results of these studies are contradictory and do not deal with the same age or educational levels as the subjects tested in the study to be reported here. Therefore, no information on these variables is presented.

Stevenson and Odom (1962) found no significant difference between first- and second-grade boys and girls tested on a conditioning task using a marble game.

Lanyon and Drotar (1962) tested high school students on the Taffel procedure and found no significant difference between males and females and change scores on the conditioning task. Baer and Goldfarb (1962) reported no significant difference between third-, sixth- and tenth-grade boys and girls and change scores of the Taffel conditioning procedure. Also, Buss and Gerjouy (1958), Ferguson and Buss (1960), and Meyer and Swanson (1964) report studies involving verbal conditioning tasks with male and female patients, with first- and second-grade students, and with fourth- and sixth-grade students. In none of these three studies was a significant difference found between males and females and change scores on the conditioning tasks.

Lewis (1965), using a verbal conditioning procedure involving third-grade boys and girls, found no significant difference between boys and girls and their performance on the task.

Hill and Stevenson (1964), using a conditioning task involving a marble game with kindergarten and second-grade boys and girls, found that boys conditioned significantly better than girls.

Only the Hill and Stevenson study found that sex was related to level of conditioning on an operant conditioning task. Seven other studies reported found no relation between sex of subject and level of conditioning. The studies reviewed here do not indicate that males or females condition better on operant conditioning tasks.

CHAPTER III

Method

Subjects

The original patient sample contained 110 white male and 109 female patients diagnosed as schizophrenic without organic involvement. The patients lived in six wards of the Rehabilitation Service at the Ypsilanti State Hospital. Each ward contained two large dormitories and one dayroom. The dayrooms were furnished with chairs, sofas, television, books, and magazines. Each ward was served by personnel in occupational therapy, recreational therapy, social work, nursing and psychiatry. All six wards were open and the patients had ground privileges.

The final sample included 40 male and 40 female, white, schizophrenic patients who could read, write, understand the test directions, and cooperate with the experimenter. The mean age of the patients was 46.35 years old, range 24-59, median 47.5. The mean length of institutionalization was 12 years, range 1-37, median 9 years, and the mean level of education attained was 10.5 years of school, range 5-16 years, median 11 years. (See Appendix A.)

Tests and Measures

The Personality Scale of Manifest Anxiety developed by Taylor (1951) was used to assess the subjects' general level of anxiety. This paper and pencil test contains 50 true and false items and was filled out by the subject (see Appendix B). The Maudsley Personality Inventory developed by Eysenck was used to assess the subject's level of introversion and level of neuroticism (see Appendix C).

A sentence construction task similar to that developed by Taffel (1955) was used to examine changes in patient usage of selected pronouns to preface sentences when certain pronouns were reinforced during a period of acquisition.

The Taffel procedure involved asking the subject to make up sentences using one of six pronouns printed on the bottom of an index card, as well as a past tense verb printed in the middle of the card. Eighty different common verbs were used with 80 different permutations of the six pronouns. "he," "she," "we," "you," "they," and "I." Taffel and others used 20 cards to obtain a base rate, and three additional sets of 20 cards each for acquisition trials. Pretest data for this study indicated that 35 cards are required during the base rate period. The use of 35 stimulus cards results in a loss of only 20% of the subjects who do not emit pronouns "I" and "we" during the base rate period.

Taffel compared the frequency of sentences beginning with "I" and "we" emitted during the 20 unreinforced base rate trials with the frequency of sentences beginning with these pronouns separately for three successive blocks of acquisition trials. Sentences beginning with "I" and "we" were verbally reinforced with "good" by the experimenter during the acquisition trials. Each block of acquisition trials included 20 stimulus cards. The Taffel method of comparing frequency of responses during the base rate period and during acquisition trials provides an inaccurate measure of change for two reasons. First, the frequency count of responses emitted in acquisition trials should begin after the first time a selected pronoun is reinforced. The first reinforced response should not be included since we are interested in the change in frequency of this response after it has once been reinforced. Second, the pronouns selected for reinforcement may not be emitted immediately during the first or even the second acquisition periods. Therefore, if the change score is based on the number of times a pronoun is emitted during the total 20 trials of an acquisition period, the data would be biased and the size of the change score calculated correspondingly

reduced. For example, if pronouns "I" and "we" were used to begin a sentence 40% of the time during the base rate period of 20 trials and were emitted only 50% of the time during the first 20 trials of acquisition, the positive change score would be only 10%. If neither "I" nor "we" was emitted until the eleventh trial of the first block, but were emitted during all the trials from 11 through 20, then the actual change score would be 60%. For these two reasons there were 35 trials during the base rate period and a total of 45 trials for the acquisition period in this study.

A change score was calculated for each patient, to compare the frequency with which the pronouns "I" and "we" were used to start sentences in the base rate period and during the acquisition period. The change score involved calculation of the percentage of times the patient used pronouns "I" and "we" during the 35 unreinforced trials and subtraction of this score from the total percentage of time the patient used "I" and "we" during the acquisition trials after each pronoun had been reinforced one time. (See Appendices D and C for pronouns used and score sheet).

Information on age, sex, length of institutionalization, and education was collected from hospital records on each patient. The Manifest Anxiety Scale and the Maudsley Personality Inventory were scored using the appropriate scoring stencil. The scores on these tests were recorded for each patient.

All information on each patient was coded and punched on IBM cards; statistical analysis of the data was carried out on the IBM 7090 at The University of Michigan Computing Center.

Procedure

All patients in the original sample were tested in groups of 10-20 on the Manifest Anxiety Scale and the Maudsley Personality Inventory. At least two experimenters, one male and one female, were present with each group of patients. Seventeen female and 6 male patients were unable to read or could not see to read without glasses; 9 female and 10 male patients were unable to understand the test directions, and 20 female and 22 male patients refused to take the test. The remaining 72 male and 63 female patients were randomly assigned to one of eight experimental conditions designed to allow assessment of three variables in relation to reinforcer effectiveness: (a) isolation and non-isolation conditions, (b) sex of patients, and (c) sex of experimenter. The average number of patients assigned to each group was 17.

Patients from each group were tested on the sentence construction task until a sample of 10 patients was obtained for each group. Out of the 135 patients assigned to the experimental groups, 8 patients refused to take the second test, 14 were unable to understand the directions, 9 patients left the hospital after the first testing, 3 patients left the room during isolation, 8 patients did not emit the pronouns selected for reinforcement during the acquisition trials, and 13 patients were not tested because a sample of 10 patients had already been obtained for the condition to which they had been assigned.

Twenty male and 20 female patients were tested after a 15-minute period of social isolation. Forty patients, 20 males and 20 females, were tested without being subjected to a period of isolation. In both the isolation and non-isolation condition, half of the male and female patients in each condition were tested by an experimenter of the same sex, and the other half were tested by an experimenter of the opposite sex. The design of the experimental conditions is presented in Table 5.

Table 5

No Social Isolation	15-Minute Social Isolation
I. 10 males with female experimenter	V. 10 males with female experimenter
II. 10 males with male experimenter	VI. 10 males with male experimenter
III. 10 females with female experimenter	VII. 10 females with female experimenter
IV. 10 females with male experimenter	VIII. 10 females with male experimenter

All of the subjects were met on the ward by the assigned experimenter who introduced himself as "I'm Mr. (Miss) X; I am a social worker here to talk to you." Experimenters were two male and two female university students. Three of the experimenters hold the degree of Master of Social Work and the fourth has a Bachelor of Science degree. The experimenters ranged in age from 22 to 34 years of age. All experimenters had two years' experience testing, interviewing and working with schizophrenic patients.

The patient was then taken by the experimenter to one of the testing rooms just outside the door to each ward. The testing rooms measured about 16 x 18 feet, had one window that faced the street, contained one or two tables and several chairs, and were provided with curtains. No other furnishings were supplied in these rooms.

The patient was asked to spell his name, give his age and was then asked two more questions: (1) "Where are you from?" and (2) "How long have you been here at the hospital?" After the patient responded to these questions, the experimenter continued: "We are interested in the kinds of sentences people make up. I want you to look at these

cards and I will explain what we will do." The patient was shown a sample stimulus card and told: "Please read the verb and the pronouns on this example card. Make up a sentence using the verb and any one of the pronouns on the card."

After the patient responded with a sentence to the sample card, the experimenter repeated the instructions. All patients were then presented with a deck of 35 stimulus cards. The patient was instructed to make a sentence using the verb and one of the pronouns on the top card, place the card upside down in a discard pile and repeat the procedure with the next card in the deck. No reinforcement was given during the base rate period. If a prompt was required by the experimenter to get the patient to continue, the experimenter said: "Next card." The experimenter recorded the frequency of usage of each pronoun on a score sheet for 35 trials. The frequency of usage of the pronouns on the 35 unreinforced trials was used to determine the base rate of pronoun usage for each patient.

Subjects in the non-isolation groups were tested immediately on cards 36-80. This section of the experiment constituted the acquisition trials. The experimenter reinforced the patient verbally using the word "good" for each sentence beginning with the pronoun "I" and "we" during trials 36 to 80. The conditioning task lasted approximately 15 minutes.

Upon completion of the first 35 unreinforced trials, patients in the social isolation group were told by the experimenter: "Excuse me, I have to leave for a few minutes. Please wait for me here." No explanation was given for his absence. "I will be back in 10-15 minutes. Make yourself comfortable." The experimenter then left the patient alone in the testing room for a period of 15 minutes.

After 15 minutes, the experimenter returned to the experimental room, thanked the patient for waiting and began acquisition trials 36 to 80. Sentences beginning with "I" and "we" were followed by reinforcement "good" by the experimenter.

At the end of the acquisition trials, all patients were asked four questions to determine if the patient could verbalize the contingency for reinforcement. These questions were:

1. How did you decide what sentences to make up?

2. How did you decide which pronouns to use?

3. Did you notice any change in the choice of pronouns you used?

4. Was there anything I did that you noticed that might have influenced you?

The experimenter recorded the patient's responses to the questions, thanked him, and walked with him back to his ward.

CHAPTER IV

Results

Four patients out of a sample of 80 were able to verbalize the contingency of reinforcement utilized in the verbal conditioning procedure. One male and one female patient in the isolation and one each in the non-isolation condition noticed that the experimenter said "good" every time the subject used "I" or "we" to start a sentence. Since the four patients were distributed by sex and condition of testing in the experiment, subjects used in this study may be considered essentially unaware of the contingency of reinforcement.

t Tests for differences of means were computed to ascertain whether or not isolation and non-isolation groups were randomly distributed on the variables of age, length of institutionalization, education, neuroticism score, introversion and extroversion score, and Manifest Anxiety score (see Table 6).

Table 6

t Test for Difference of Means for

Isolation and Non-isolation Groups on Six Variables

	Non-isolation		Isolation				
Variable	Mean	SD	Mean	SD	DF	T	
Age	47.3	6.8	45.4	9.4	78	1.068	N.S.
Length of Instit.	13.1	9.9	10.9	8.1	78	1.056	N.S.
Education	10.5	2.3	10.5	2.3	78	-.097	N.S.
N-Score	22.3	14.7	25.8	12.7	78	-1.140	N.S.
I-E Score	23.3	8.6	25.6	7.4	78	-1.232	N.S.
MAS Score	17.3	11.3	20.2	10.1	78	-1.232	N.S.

Required *t* value for significance at the .05 level with 78 df is 1.99.

Table 6 indicates that there were no differences at the .05 level of significance between the isolation and non-isolation groups on age, length of institutionalization, education, neuroticism score, introversion-extroversion, and Manifest Anxiety score.

A Chi-square test was used to determine whether the four diagnostic groups were randomly distributed between isolation and non-isolation groups; these data are presented in Table 7.[2]

TABLE 7

Chi-square Test for Comparison of

Isolation and Non-isolation Groups on

Four Diagnostic Categories of Schizophrenic Patients

Diagnosis	Isolation	Non-isolation	
Undifferentiated	17.5 / 14	17.5 / 21	35
Paranoid	14.5 / 15	14.5 / 14	29
Hebephrenic	5.5 / 8	5.5 / 3	11
Catatonic	2.5 / 3	2.5 / 2	5
	40	40	80

χ^2 required with 3 df at the .01 level is 11.34.

χ^2 obtained = 38.00.

Table 7 indicates that the four diagnostic groups were not equally represented in both conditions of isolation and non-isolation. Inspection of the data presented in Table 7 shows that the isolation group contained fewer patients diagnosed as undifferentiated schizophrenic, and more patients diagnosed as hebephrenic when compared with the non-isolation group.

Since the isolation and non-isolation groups were not evenly distributed on the four diagnostic groups, a one-way analysis of variance was computed for change score and diagnostic groups individually, for patients tested under conditions of isolation and non-isolation. This test was run to determine if patients in the four diagnostic groups differed significantly in their change scores on the conditioning task. Table 8 presents data on the means and numbers of patients tested under both conditions of isolation and non-isolation.

Table 8

Mean Change Scores for Patients in Four Diagnostic Groups

Diagnosis	Non-isolation	Isolation
Undifferentiated	1.94	16.31
Paranoid	2.96	8.69
Hebephrenic	2.21	22.38
Catatonic	3.79	21.16

Tables 9 and 10 present information on the results of each analysis of variance test.

Table 9

One-way Analysis of Variance for Differences of Change Score Means for Patients in Four Diagnostic Groups Tested Under Conditions of Non-isolation

Source	SS	df	MS	F	
Between	13.2230	3	4.408	.02	N.S.
Within	7592.0222	36	210.890		
Total	7605.2452	39			

Required F value for a one-tail test with 3 and 39 df is 2.85 for the .05 level.

Table 10

One-way Analysis of Variance for Differences of Change Score Means for Patients in Four Diagnostic Groups Tested Under Conditions of Isolation

Source	SS	df	MS	F	
Between	815.82	3	271.94	.69	N.S.
Within	14194.96	36	394.30		
Total	15010.78	39			

Required F value for a one-tail test with 3 and 39 df is 2.85 for the .05 level.

The results in Tables 9 and 10 indicate that there were no significant differences between four diagnostic groups and change scores under conditions of isolation and non-isolation.

Although a significant difference was found in the distribution of patient of four diagnostic types under conditions of isolation and

non-isolation, the data presented previously in Tables 8, 9, and 10 indicate that this difference does not contaminate other results, as there were no significant differences between the diagnostic groups on change scores tested under either conditions of non-isolation or isolation.

Isolation - Non-isolation

Sex of Subject - Sex of Experimenter Interaction

In order to test Hypotheses 1 and 2, a three-way analysis of variance was computed to test the difference of means of the change scores under the conditions of isolation versus non-isolation, male versus female patients, male versus female experimenters, and for interactions of these three factors. (See Table 18.)

Tables 11 - 17 present information regarding the means of these variables. Table 18 presents the results of the three-way analysis of variance carried out on these data. (See Appendix F for individual change scores.)

Table 11

Mean Change Score for Isolation and Non-isolation Condition

Non-isolation	Isolation
2.56	14.34

Table 12

Mean Change Score for Male and Female Patients

Male Patient	Female Patient
8.21	8.69

Table 13

Mean Change Score for Male and Female Experimenters

Male Experimenter	Female Experimenter
8.57	8.33

Table 14

Mean Change Scores for Sex of Patient, Sex of Experimenter Interaction

		Experimenter: Male	Experimenter: Female
Patient	Male	5.66	10.76
	Female	11.49	5.89

Table 15

Mean Change Scores for Sex of Patient, Isolation - Non-isolation Condition Interaction

		Non-isolation	Isolation
Patient	Male	2.02	14.39
	Female	3.09	14.29

Table 16

Mean Change Scores for Sex of Experimenter, Isolation - Non-isolation Condition Interaction

		Non-isolation	Isolation
Experimenter	Male	2.77	14.38
	Female	2.35	14.31

Table 17

Mean Change Scores for Triple Interaction of Isolation - Non-isolation Condition, Sex of the Subject, Sex of the Experimenter

NON-ISOLATION

		Experimenter	
		Male	Female
Subject	Male	3.00	1.00
	Female	2.54	3.64

ISOLATION

		Experimenter	
		Male	Female
Subject	Male	8.32	20.46
	Female	20.44	8.15

Table 18

Three-way Analysis of Variance for Change Scores Under Conditions of Isolation-Non-isolation, Sex of Subject, Sex of Experimenter and for Interaction of These Variables

Source	SS	df	MS	F	
Isolation - Non-isolation (A)	2777.6067	1	2777.61	9.49	P < .01
Sex of Subject (B)	4.6997	1	4.70	.02	
Sex of Experimenter (C)	1.2227	1	1.22	.00	
AB	6.7453	1	6.75	.02	
AC	.6072	1	.61	.00	
BC	572.1824	1	572.18	1.95	N.S.
ABC	943.1826	1	943.18	3.22	N.S.
Within	21081.3741	72	292.80		
Total	25387.6207	79			

Required F value for significance at the .01 level is 6.96; for .05 level of significance, the required F value is 3.96.

The results in Table 18 showed that patients tested after a period of isolation achieved higher change scores than patients tested without a prior period of social isolation. This difference was significant at the .01 level. The comparisons of the male and the female patients showed that neither males nor females scored significantly higher on change scores. No significant differences were demonstrated between the male and the female experimenters. None of the interaction effects between means for: (a) isolation-non-isolation, and sex of patients; (b) isolation-non-isolation and sex of experimenters; or (c) sex of patient and sex of the experimenter achieved a statistical level of significance.

The triple interaction between change score and isolation-non-isolation, sex of patients, sex of experimenter, also, did not achieve a statistical level of significance.

Inspection of the mean differences between change scores on the interaction of the sex of patient and sex of experimenter, under conditions of social isolation (Table 17), suggested that the patients achieved higher change scores when tested by an experimenter of the opposite sex. Therefore, a two-way analysis of variance was carried out to test the significance of the interaction of the sex of patient and sex of experimenter under conditions of social isolation.[3]

Table 19 presents the results of the two-way analysis of variance.

Table 19

Analysis of Variance

Source	SS	df	MS	F
Sex of Patient (B)	.0922	1	.0922	.00
Sex of Experimenter (C)	.0533	1	.0533	.00
BC	1492.3065	1	1492.3065	3.97
Within	13518.8324	36	375.5231	
Total	15011.2844	39		

Required F value for .05 level of significance is 4.11.

Table 19 indicates that under conditions of social isolation, male patients achieved higher change scores when tested by a female therapist, and female patients achieved higher change scores when tested by a male experimenter ($p < .07$).

In summary, Hypothesis 1, which postulated increased effectiveness of social reinforcements after a period of social isolation in a verbal conditioning task with schizophrenics, was supported. Hypothesis 2, which postulated that patients would achieve higher change scores when tested by an experimenter of the opposite sex, was not supported. An interaction at the .07 level that tended to significance was found between sex of patient and sex of experimenter only under conditions of social isolation.

Anxiety

Introversion

In order to test Hypotheses 3 and 4, correlation coefficients were computed for the patients' change scores on the conditioning task and scores on the MAS and IE scale of the MPI. (See Appendix G for scores on MAS and IE scales.)

Correlation coefficients were also computed for the scores on four control variables: age, length of institutionalization, education, and score on the neuroticism scale of the MPI. Table 20 presents these data.

Table 20

Correlation Coefficient Matrix for Seven Variables

Variables	1	2	3	4	5	6
1						
2	.21					
3	-.15	-.11				
4	-.06	.02	.07			
5	.05	.05	.18	.30*		
6	-.14	.12	.01	.73*	.18	
7	-.34*	-.19	.11	.17	-.06	.17

*Required for significance at the .01 level is 0.287.

Test Variables

1. Age.
2. Length of institutionalization.
3. Level of education.
4. Score on Neuroticism Scale of MPI.
5. Score on Introversion-extroversion scale of MPI.
6. Score on Manifest Anxiety Scale.
7. Change score on verbal conditioning test.

The correlation between scores on the MAS and change scores on the conditioning task was not significant. Therefore, Hypothesis 3, which postulated no significant relationship between change scores on an operant conditioning task and scores on MAS, was not contradicted.

No significant correlation was found between scores on the IE scale of the Maudsley Personality Inventory and change scores on the conditioning task. Therefore, Hypothesis 4 which postulated no significant relationship between change scores and scores on the IE scale of the MPI was not contradicted.

On the control variables, no significant correlation was found between change scores and sex of patient, length of institutionalization, level of education or scores on the N scale of MPI. The correlation between age and change scores on the conditioning task was significant at the .01 level. The value of the correlation was -0.34 which, although significant, indicates only a low correlation between the two variables.

A strong correlation, $r = 0.73$, was found between scores on the Neuroticism Scale of the MPI and anxiety scores on the MAS. This correlation is significant at the .01 level. A weak correlation, $r = 0.30$, was found between scores on the Neuroticism Scale of MPI and scores on Introversion-Extroversion scale of the MPI. This correlation was also significant at the .01 level.

The test items on the Manifest Anxiety Scale were taken from the Minnesota Multiphasic Personality Inventory and are similar to the test items on the Maudsley Personality Inventory. Therefore, significant correlations between the scales on the tests were expected.

CHAPTER V

Discussion

The results of this study are discussed in two parts. The first, Experimental Results, treats the results of this present study only in terms of the existing data related to the four experimental variables. In the second, Hypotheses and Speculations, the author discusses possible applications of this body of knowledge to methods of therapeutic treatment. This dichotomy has been made to emphasize the difference between statistically supported evidence concerning the function of certain variables in operant conditioning situations and speculations and hypotheses concerning individual treatment which may be generated from these data.

The assumption is often made that what "works" in the laboratory must also work in a therapy setting. Everyone involved in the treatment of disfunctional behavior is eager and often impatient to find more effective procedures for treatment that may be used to facilitate desirable changes in the client's behavior. This desire to effect behavioral change often results in an over-extension or hasty application of new knowledge in methods of treatment. Persons in the treatment professions are in a dilemma. They are dissatisfied with the results of present methods of treatment. If treatment professionals wait until learning theorists or others perfect methods of changing behavior, they may remain in a limbo of discontent for many years. If data gained from laboratory studies is used in applied settings, disappointment may develop if the new techniques of change do not seem to achieve more effective or stable results than previously unsatisfactory approaches. This disappointment could result in the abandonment of good experimental data. In order to resolve this dilemma, three things should be done. First, efforts to replace old treatment approaches with new, experimentally supported procedures should

be continued. Second, data that results from experimental studies must be considered experimental in applied situations. And, finally, more experimental investigations should be carried out in applied settings.

Experimental Results

The results of the present study lend additional support to the hypothesis that the effectiveness of a social reinforcer will be increased following a period of social isolation. All nine studies reported in the literature reviewed earlier in this paper found a significant increase in the effectiveness of social reinforcement following a short period of social isolation. All studies that utilized an isolation period of 12 to 30 minutes using verbal and non-verbal conditioning procedures reported similar results. Therefore, this evidence strongly suggests that a period of isolation enhances reinforcer effectiveness in a repeatable manner.

Additional studies will be necessary to determine whether or not a limited but monotonic relationship may exist between length of social isolation and increased effectiveness of social reinforcement. Additional studies will be needed to determine the optimal conditions of social isolation that will result in the maximum effectiveness of social reinforcers.

No significant differences were found between subjects tested by experimenters of the same or opposite sex using an overall analysis of variance for conditions of isolation and non-isolation. The results of this study support the findings of Gewirtz and Baer (1958b) that reinforcement presented by an experimenter of the opposite sex was more effective with subjects only after a short period of social isolation. Additional studies are needed that specifically investigate the interaction effect of sex of subject and sex of experimenter and the effectiveness of social reinforcement under conditions of both isolation and non-isolation. No

reliable conclusions can be drawn with regard to these two variables based on present experimental data.

The results of this study indicate that no significant relationship exists between scores on MAS and level of conditioning on an operant task. Neither the results of this study, nor the eight studies reported in this paper, show a consistent or a significant relationship between scores on MAS and conditionability.

The theory postulated by Eysenck (1957) that predicted greater conditionability of introverts than extroverts as measured by MPI was not supported by this study or by the data of four other authors reported in this paper.

Further experimental attempts to study the possible relationship between anxiety or introversion and conditionability would not be indicated using test scores for anxiety and introversion obtained by pencil and paper tests. Pencil and paper measures of anxiety and introversion-extroversion are considered a reflection of internal level of arousal. Physiological measures may be made using GSR, etc.,that directly measure the level of the patients' arousal. Further experimentation concerning the relationship of level of arousal and conditionability in an operant task should utilize information on level of arousal obtained by physiological indicators.

Hypotheses and Speculations

It may be hypothesized on the basis of the results of this study and others reviewed in this paper that a short period of social isolation should enhance the effectiveness of the social reinforcer, "good," in the therapeutic interview. This hypothesis would require testing, as there are many differences between the experimental studies using social reinforcement in interview-like situations and the therapy situation

itself. The subjects tested in the experimental studies were seen by the experimenter for only one session. The sessions were brief and lasted on the average only 15 minutes. No relationship, transference, etc., was built up between the patient and therapist. Support or empathy for the patient was not actively administered. And, finally, the experimental task was pre-planned; the experimenter knew what he was trying to do, and what procedures he must follow to reach his goals. The behavior to be modified was specified in advance and the frequency of this behavior was recorded throughout the session. The experimenter had a working knowledge of the "change" technique to be used and the contingency for reinforcement.

Often, the therapist has very little information concerning the client on the first interview. Many interviews may be required to gather information concerning the patient's problematic behavior before any goal-oriented change techniques may be used. Often the therapist must support, reassure and win the confidence and trust of his patient before accurate data are obtained to allow specification of the problem and the most appropriate treatment procedure. We do not know what effect the establishing of a supportive relation between the therapist and client might have on the effectiveness of social reinforcement administered by the therapist. A close relationship between the therapist and patient may increase or decrease the effectiveness of reinforcers administered by the therapist.

A second question arises: Why should the therapist shape up and reinforce verbal behavior of the patient in order to obtain information about the client's problem? Why not just ask the patient to give information in these areas? Some patients are able to provide accurate information concerning themselves and other people without experiencing

a great deal of anxiety. With these patients questions may be used to obtain required information on the client's problematic condition. Other patients are not able or willing to remember or discuss certain difficult aspects of their life. With these clients, shaping and positive reinforcement should be used to guide the patient's verbalizations slowly into areas that may shed additional light on their problem. Once enough information is gathered on the patient's situation, a treatment goal as well as appropriate treatment techniques should be formulated.

Since we have seen that social isolation increases the effectiveness of social reinforcement, social satiation, on the other hand, should reduce the effectiveness of social reinforcement. Since potent reinforcers are necessary to bring about behavioral change in the therapeutic setting, the satiation effects should be avoided. Frequent diagnostic and treatment interviews may result in a satiation effect in the patient for social reinforcement presented by the therapist. A close relationship between the therapist and client may contribute to this satiation effect.

Diagnostic interviews often foster a close relationship between the therapist and patient. Frequent contact between the therapist and patient may cause a satiation effect to occur and reduce the therapist's reinforcing effectiveness. In order to avoid this satiation effect a second therapist could be used for the treatment interviews after an intake worker diagnoses the problem and selects the appropriate treatment procedure. The second therapist would work with the patient to facilitate behavioral changes for the pre-determined goals. The second therapist, the behavioral change agent, would confine his activities to achieving the desired behavioral changes in the patient. To maximize the effectiveness of the reinforcers used by the behavioral change agent, interviews should be brief, structured and infrequent rather than massed. This would be

done to avoid satiation effects of the social reinforcers used by the therapist to bring about client change.

Not all patients require, nor will they accept, therapy directed at behavioral change. Some individuals may actually need a chance to ventilate their feelings and thoughts in the presence of a supporting therapist. But even in this situation, a therapist may use operant conditioning techniques with social reinforcement to guide the patient's verbalizations. A therapist who is unstructured, empathic and understanding may actually foster talk of depression and personal misery unless this type of talk is replaced with more constructive ideas. Operant conditioning techniques using social reinforcement in the therapy situation are most likely to have a powerful effect upon the verbalizations and on the ideas entertained by the patient. Used in a controlled and structured fashion, these techniques increase the patient's ability to discuss his unadaptive behavior and plan his actions in an adaptive way. Used in an unplanned way, social reinforcement administered by the therapist may hinder problem-solving attempts of the client and foster a fixated activity, in the client, of merely describing, lamenting or superficially analyzing his behavior. The client may never reach a stage where an attempt is made to change the persistent, thoroughly understood but nevertheless undesirable behavior.

Although the major variables treated in this paper were related to the interview setting and the patient's personality, it must be recognized that other variables in the patient's environment may effect performance on the experimental task. Subjects in this study have limited opportunity for social experiences outside the hospital setting. In the hospital, patients work, watch TV, play pool, sew, read, attend movies and socialize with other patients on the ward and grounds. The patients in this study, from the hospital Rehabilitation Service, do

have a variety of potential social experiences. These social experiences differ in kind from normal subjects reviewed in other experimental studies, but the frequency of social contacts may not be any less. The subjects in this study live a modified and limited social life on an open ward, but appear to respond appropriately to the verbal social reinforcement, "good." Although "good" was used as the only social reinforcement in this study, other social reinforcers common in the hospital setting may also be effective.

Patients on closed wards, who are more severely disturbed, are lacking in personal and social skills and have less opportunity to socialize with other patients, who also have a limited social repertoire. It is therefore hypothesized that patients institutionalized on closed wards would be less affected by social reinforcement than those on open wards.

Another environmental factor which helps explain the results of this study is that ward attendents are of the same sex as the patients on the six wards selected for use in this study. These same-sex persons may become strong secondary reinforcers for the patients as these persons provide food, medication, and other primary and secondary reinforcers to the patients. It is possible that subjects in this study were more affected by social reinforcement from persons of the same sex, due to this learned generalization. This factor may have been responsible for reducing the expected effectiveness of social reinforcement provided to patients by an experimenter of the opposite sex, as was found in other studies conducted by Binder et al. (1957) and Baer and Goldfarb (1962).

Since the degree of impairment of social skills enters into the diagnosis of mental illness, a final speculation will be made that

patients who are less severely impaired are more affected by social reinforcement. Severely impaired patients receive and emit less social reinforcement than do persons less impaired in social skills. To provide some information on this idea, the hospital records of the 40 subjects tested under the non-isolation condition were examined to determine how many of the patients had left the hospital since the testing one month before. It was found that 20% of the subjects ($\underline{N}$ = 20) who achieved change scores in the positive direction had left the hospital. None of the subjects ($\underline{N}$ = 20) who achieved change scores in the negative direction had left the hospital. This suggests that individuals who do not respond in a positive way to the social reinforcement, "good," are also considered less prepared for release from the hospital by the hospital staff. The author suggests that the relation between effectiveness of social reinforcement and the patient's suitability for release from the hospital provides an interesting area for future work.

CHAPTER VI

Summary

Eighty white schizophrenic patients were administered the Taylor Personality Scale of Manifest Anxiety and the Maudsley Personality Inventory and were tested on an operant conditioning task. Subjects were verbally reinforced with "good" during the acquisition trials for all sentences constructed beginning with the pronouns "I," and "we." Subjects received no reinforcement during the base rate trials. A change score was calculated to determine the per cent change in frequency of sentences beginning with "I," and "we" during base rate period compared to the acquisition period.

Forty subjects were tested following a short period of social isolation, the other 40 subjects were not isolated before testing. Half the subjects under each condition were tested by a male experimenter and the other half by a female experimenter.

Four hypotheses were tested in this study: (1) The effectiveness of social reinforcement (in the form of verbal approval) would be enhanced by subjecting the patient to a short period of social isolation prior to the use of reinforcement "good" in a verbal conditioning task; (2) Social reinforcement presented by an experimenter of the opposite sex of the subject would be maximally effective; (3) No significant relationship exists between the personality variable "anxiety" as measured by the Taylor Manifest Anxiety Scale and change scores of the schizophrenics on a verbal operant conditioning task; and (4) No significant relationship exists between the personality variable, introversion, as measured by the Maudsley Personality Inventory and change scores of the patients on the conditioning task. This study also provides information on six other variables which may be related to conditionability of schizophrenics. These variables include age, sex

education, diagnosis, length of institutionalization, and level of neuroticism (as measured by the Maudsley Personality Inventory).

Results of the study showed that schizophrenic patients who were socially isolated for a period of 15 minutes before testing, emitted significantly more reinforced pronouns during the acquisition period ($p < .01$) than patients who were not isolated before testing. Second, results also indicated that only patients tested following the isolation period conditioned better when tested by an experimenter of the opposite sex ($p < .07$). No significant correlations were found between subjects' scores on either the MAS or on the IE scale of the MPI and change scores on the conditioning task. No significant relation was found between change scores and sex of the patient, length of institutionalization, education, or scores on the N scale of the MPI.

Appendices A through G

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available from author on request.

FOOTNOTES

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[2]Chi-square Test of Goodness of Fit may be used with tables with only some expectations greater than five, if there is more than one degree of freedom. Cochran, W. G., The Chi-square Test of Goodness of Fit, Annals of Mathematical Statistics, 1952, 23(31), 334.

[3]Since the author had information from a previous study (Gewirtz & Baer, 1958b) that suggested that subjects may condition better when tested by an experimenter of the opposite sex only under conditions of social isolation, it is considered permissible to reanalyze the data to look for this effect. This information was obtained from Esther Schaeffer, University of Michigan, Rackham Statistical Laboratory, June 24, 1968. The triple interaction of condition of isolation, sex of experimenter, and sex of subject almost reached a statistical level of significance (see Table 18). Since the interaction between sex of subject and sex of experimenter were in opposite directions under conditions of isolation and non-isolation, it was expected that analysis of the data separately under the isolation condition might reach significance in accordance with the Gewirtz and Baer study.

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